BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

19 FRENCH REPUBLIC

NATIONAL INSTITUTE OF INDUSTRIAL PROPERTY PARIS

11 Publication no.: not to be cited except in the case of copy orders **2 739 947**

21 International registration no: **95 12130**

51 Int. Cl[5]: G 05 G 1/14, 1/24, B 60 K 23/02, 26/02, B 60 T 7/06

12 PATENT APPLICATION A1

22 Application date: October 17, 1995

30 Priority:

43 Date the request was disclosed to the public: April 18 1997 Bulletin 97/16.

56 List of documents reference in the preliminary search report: *See end of this document.*

60 References to other related national documents:

71 Applicant(s): *REGIE NATIONALE DES USINES RENAULT SOCIETE ANONYME – FR.*

72 Inventor(s): URSET, CHARLES, SALMON MICHEL and CASADEI NELSON.

73 Holder(s):

74 Attorney(s): KOHN PHILIPPE.

54 PEDAL CLUSTER FOR AUTOMOTIVE VEHICLE COMPRISING A DEVICE FOR ADJUSTING THE HEIGHT AND THE ORIENTATION OF THE PEDALS

57 The invention concerns a pedal cluster, in particular for an automotive vehicle, of the type comprising at least one pedal (34, 36) for controlling an mechanical element of the vehicle, of the time in which an adjusting device (38) is provided for the longitudinal position of the pedals (34, 36) in the vehicle passenger compartment, and of the type in which the pedals (34, 36) are mounted on a plate (52) that is mounted so that it is mobile on at least one longitudinal sliding surface (50) fastened to a frame (40) that is fixed to the vehicle chassis, characterized in that for at least one pedal (34, 36), the adjusting device (38) changes the distance between the pedal (34) and the floor (12) of the vehicle as an adjusting function of the longitudinal position of the pedal (34, 36).

The invention concerns a pedal cluster for an automotive vehicle, comprising a device for adjusting the height and the orientation of the pedals.

The invention more specifically concerns a pedal cluster, in particular for an automotive vehicle, of the type comprising at least one pedal for controlling a mechanical element of the vehicle, of the type in which a device is provided for adjusting the longitudinal position of the pedals in the passenger compartment of the vehicle, and of the type in which the pedals are mounted on a plate that is mounted so that it is mobile on longitudinal sliding surfaces fastened on a frame that is fixed to the chassis of the vehicle.

In order to permit easy and comfortable driving of an automotive vehicle, it is necessary to be able to adjust the relative positions of the seat and of the pedal cluster as a function of the driver's morphology.

In some cases, it is preferably to provide the implementation of a seat fixed in the vehicle passenger equipment and to equip the pedal cluster with a device for adjusting the longitudinal position of the pedals, which are then mounted on a plate, which is able to slide on fixed sliding surfaces that are mounted so that they are longitudinal with respect to the vehicle passenger compartment.

In order to make their use easy, these devices are generally driven by an electric motor.

Such devices, if they effectively make it possible to make the pedals accessible to the driver, no matter what the driver's size, do not make possible a fine adjustment of the pedal positions, in particular in height or in orientation in a vertical longitudinal plane.

In order to resolve this problem, this invention proposes a pedal cluster of the type seen before, characterized in that, for at least one pedal, the adjusting

device modifies the distance between the pedal and the floor of the vehicle as a function of the longitudinal position adjustment of the pedal.

According to other characteristics of the invention:

- the sliding surface, on which the plate is mounted, extends along an oblique direction with respect to the orientation of the floor of the vehicle in the vicinity of the pedal cluster;

- the adjusting device changes the orientation of the pedal in a longitudinal vertical plane of the vehicle as a function of the adjustment of the longitudinal position of the pedal cluster plate;

- the pedal is mounted on the plate, hinged around a transverse axis, between a rest position and an active position, it controls a mechanical element of the vehicle by means of a link connection rod with fixed length that is hinged, in a vertical longitudinal plane, by its two ends, on one hand on the pedal and, on the other on a control element for the mechanical element of which a rest position is independent of the longitudinal position of the pedal at rest, and the rest position of the control element for the mechanical element determines the rest position of the pedal around its axis by means of the link connection rod of fixed length;

- a transmission, mounted so that it pivots around a fixed axis that is transverse with respect to the vehicle chassis, is mounted between the link connection rod and the control element for the mechanical element;

- the pedal is mounted on a support that is mobile with respect to the plate, means for controlling the movements of the support are provided, as a function of the movements of the plate with respect to the frame;

- the support is mounted with rotation around a transverse axis, on the plate, and the support is controlled in rotation around its axis as a function of

the longitudinal movement of the plate;

- the support comprises a transverse tab that is received in a port that is fixed with respect to the frame and which extends in a longitudinal vertical plane, the port and the tab forming, respectively, a cam groove and a cam follower element, and the port is not parallel to the sliding surface, such that the transverse tab controls the rotation of the support when it passes into the port during a longitudinal movement of the plate;

- the orientation of the pedal in rest position is fixed with respect to the support;

- the orientation of the pedal in rest position with respect to the support is variable;

- the rest position of the pedal with respect to the support is determined by a stop connected to a stop housing that can move with respect to the support and which comprises means of control for its movements with respect to the support as a function of the longitudinal position of the plate;

- the stop housing is mounted so that it pivots on the support around a transverse axis and comprises a transverse operating pin that is received in a guiding groove that is connected to the frame and that extends in a longitudinal vertical plane and the groove and the operating pin form a cam groove and a cam follower element, respectively, in such a way that the transverse operating pin controls the pivoting of the stop housing when it runs in the groove at the time of a longitudinal movement of the plate;

- when the plate is moved longitudinally from the rear to the front, the adjusting device moves the pedal from the floor and orients it in such a way as to arrange it in a more vertical position;

- a plate position is provided in which the pedal is made inaccessibl , th goal being to create an anti-theft device;

- the pedal cluster comprises several pedals and the adjusting device acts on several pedals.

Other characteristics and advantages of the invention will be sent from reading the detailed description that follows, for understanding of which reference is made to the attached drawings, in which:

- figures 1 and 2 are schematic lateral views that represent the ideal arrangement of a pedal, respectively for a short driver and for a tall driver;

- figures 3 and 4 are perspective views showing an embodiment of a pedal cluster according to the invention;

- figure 5 is a schematic lateral view illustration a first method for connecting a pedal on such a pedal cluster;

- figures 6 and 7 are lateral view of a second method for connecting a pedal to such a pedal clustered, represented in the extreme retracted position and extreme advanced position, respectively.

Figures 1 and 2 show a seat 10 of the automotive vehicle, fastened to the floor 12 of the vehicle and comprising, in particular a seat back 14 and a seat 16.

The driver is seated on the seat in such a way that his trunk 18 rests against the seat back 14, his thighs being held by seat 16.

The seat 16 is dimensioned in such a way that, even in the case of a very

short driver, rotation of the legs 22 around the range of the knees 24 is not obstructed.

The heels 26 of the driver rest on the floor 12 of the vehicle, while the front part 28 or the foot 25 can come in contact with a pedal 30 that is mounted and hinged between a rest position and an active position, on a pedal cluster, not shown around a transverse axis A1.

So that operation of the pedal 30 will be as comfortable as possible, it is preferably that when the heel 26 of the driver rests on floor 12 and when foot 25 forms an essentially right angle with respect to the leg 22, the front part 28 of foot 25 performs an action that is approximately perpendicular on the pedal 30.

Still, as can be seen in figure 2, when the driver is very tall, his lower extremities are proportionally larger than those of a person of small size and even though the height of seat 16 of seat 10 remains constant, since the leg 22 is longer, it forms a smaller angle with the floor than in the case of a shorter person. The result of this is that, so that the foot 25 of the driver can remain essentially perpendicular to his leg 22, and so that contact of foot 25 with pedal 30 is always perpendicular, it is necessary to pivot the orientation of pedal 30 in rest position, around a transverse axis.

In the same way, since the foot 25 of a tall person is longer than the foot of a short person, it is necessary to provide for raising the position of pedal 30 with respect to floor 12 in such a way that the driver makes contact with pedal 30 with the front part 28 of foot 25 when the heel 28 is in contact with the floor 12.

Figures 1 and 2 thus make it possible to show why there is a great interest in designing a pedal cluster that makes possible not only a longitudinal adjustment of pedal 30 so that it will be accessible to the driver, but also that this pedal cluster makes it possible to adjust the height of pedal 30 and its orientation in a vertical longitudinal plane of the vehicle.

An embodiment of the invention will now be described, with reference to figures 3 to 7.

In the description that follows, the terms "horizontal," "vertical," "lower" and "upper" are used with reference to the attached drawings in order to make the description more understandable, but they most not be interpreted as a limitation to the scope of invention.

The invention will be described, in particular, where the pedals are hinged on the pedal cluster around a horizontal axis located above the pedals, but it is possible to implement a pedal cluster according to the invention in which the pedals are e.g. hinged around an axis that is arranged below the pedals.

Figures 3 and 4 represent a pedal cluster 32 that holds an accelerator pedal 34 and a brake pedal 36, which is equipped with a device 38 for adjusting the position of the pedals 34, 36 according to the teaching of the invention.

As can be seen, more specifically in figure 3, the pedal cluster 32 comprises a frame made up of a front 40 made up of a front cross beam 42 from which two side frames 44 extend longitudinally toward the rear.

Tubular ribs 46 are attached to the seat elements (not shown) of the vehicles, such that the floor 12 or a wheel housing, and are connected to the rear

ends 48 of side frame 44, e.g. by soldering, in order to make the frame 40 of pedal cluster 32 rigid.

Two parallel sliding surfaces 50 are arranged longitudinally with respect to each other on the faces across from each of the side frames 44.

In the embodiment that is shown in the figures, the sliding surfaces are rectilinear and they are oriented in an oblique direction in comparison to the general direction of the floor (not shown) in the vicinity of the pedal cluster, but it is possible to make sliding surfaces that are curved in a longitudinal vertical plane of the vehicle.

A plate 52 is mounted on the sliding surfaces 50 in such a way that it can slide, longitudinally along the direction of sliding surfaces 50, between an advanced position and a retracted position, with respect to the vehicle.

Control of the movements of plate 52 is carried out using a fastening lug system 54 driven by an electric motor 56.

In the suggested embodiment example, the electric motor 56, mounted to frame 40 causes a screw 48 that is arranged longitudinally, essentially between the two side frames, to rotate.

Plate 52 has an upper plate 60 that extends in a plane parallel to the two sliding surfaces 50, which is equipped with a boss 62 that extends upward.

Boss 62 is pierced with a threaded borehole in which screw 58 is screwed.

In the case (not shown) where sliding surfaces 50 are curved, it is necessary to mount the motor 45 so that it pivots on the rib 46 and to equip the upper plate 60 with a screw mounted so that it turns around a transverse axis in order to make it possible for the plate 52 to follow the sliding surfaces.

Plate 52 also comprises a transverse shaft, on which the brake pedal 36 is mounted and, indirectly, the accelerator pedal 34.

As can be seen, more specifically in figures 4 and 5, the brake pedal 36 is arranged at the end of a longitudinal stem 66, of which the other end is mounted hinged, around axis A2, on transverse shaft 64.

The brake pedal 36 is intended to cause a longitudinal movement of a control rod 66 of a brake assist device 68, which controls a master cylinder 70.

Master cylinder 70 and the brake assist device 68 are generally arranged in the compartment of the motor vehicle, in front of the pedal cluster, and they are fastened in such a way that rod 66 slides along a direction that is essentially longitudinal.

According to one of the characteristics of the invention, a mechanism 72 is provided for transmission of movement from the brake pedal 36, which makes it possible to transfer the pivoting movement of pedal 36 into a translational movement of rod 66.

This transmission mechanism 72 must also make it possible for the brake pedal 36 to move longitudinally with the plate 52 without any change in the positions of the master cylinder 70, the brake assist device 68 and thus the control rod 66, at rest.

For this purpose the transmission mechanism 72 comprises a movement transmission 74 that is hinged around a transverse axis A3 fastened to the vehicle.

The transmission 74 comprises two arms 76, 78 that extend radially from a cylindrical hub 80 with axis A3.

The end of the first arm 76 of transmission 74 is connected to arm 65 of pedal 36 by a link connecting rod 82, which preferably extends essentially in a longitudinal vertical plane of the vehicle and is mounted so that it pivots by its two ends on arms 65 of the brake pedal 36 and on second arm 78 of transmission 74.

The link connecting rod 82 is rigid, with fixed length, such that when the braking device 68, 70 is at rest, the control rod 66 determines the rest position of transmission 74 and, by means of link connection rod 82 with fixed length, that of brake pedal 36.

In the preferred embodiment of the invention that is shown in the figures, the two arms 76, 78 of transmission 74 are offset axially on the transverse axis A3 in such a way that the link connection rod 76 and the control rod 66 will be arranged essentially in a first longitudinal vertical plate and that the second arm 78 of transmission 74, the link connection rod 82 and the arms 65 of the brake pedal 36 would also be arranged essentially in a second longitudinal vertical plane, offset transversally with respect to the first.

Link connection arm 82 is mounted so that it pivots on arm 65 at a point arranged essentially at the side opposite pedal 36 with respect to the transverse axis A2 or rotation of pedal 36, so that when the user presses the brake pedal, the arm 65 pulls on the link connection rod 82, which in turn pulls on the second arm 78 of the movement transmission 74.

The transmission movement 74 pivots around its axis A3 in a way such that the first arm 76 presses the control rod 66 longitudinally toward the front, in

such a way as to cause a release of the vehicle braking system.

The ratios of the lengths of the two arms 76, 78 of transmission 74, as well as the ratio of the distances between the transverse axis A2 of articulation of pedal 36 and, on one hand, the pedal 36 and, on the other, the fastening point of the link connection rod 82 on arm 65, makes it possible to determine a demultiplication ratio between the movement of pedal 36 and movement of control rod 66 or the brake assist device 68.

In addition, the two arms 76, 78 of transmission 74 are offset in angle around axis A3 by a value such that, for a chosen adjusted length of link connection rod 82, on the length of the course of each of these mobile elements, the first arm 76 of transmission 74 and the control rod 82, on one hand, and finally the link connection rod 82 and the arms 65 would essentially be perpendicular.

This arrangement makes it possible to obtain an essentially constant ratio between the value of the pedal 36 movement and that of the movement of control rod 66.

The brake pedal 36 is shown in dotted lines, the arms 65 and the link connection rod 82 when pedal 36 is in extremely advanced position.

As can be seen, the orientations of the link connection rod 82 in these two positions are symmetrical with respect to a line perpendicular to the direction of sliding of plate 52, such that connection link rod 82 determines the same rest

position of the brake pedal 36 around its axis of articulation, for the two extreme positions of plate 52.

This does not present a great disadvantage when it involves a brake pedal that is stressed relatively little by the driver.

It is also possible to conceive of the link connection rod 82 being oriented in such a way that all along the longitudinal movement of plate 52, link connection rod 82 determines a slight variation in the rest position of pedal 36 around its axis A2.

More specifically, in figures 6 and 7 the mounting on the accelerator pedal 34 on pedal cluster 32 is shown.

The accelerator pedal 34 comprises an arm 86 that is mounted hinged, around a transverse axis A4, at the lower end 88 of a support 90 which it self is mounted so that it pivots, with its upper end 92, around the transverse shaft 64 of axis A2 of plate 52.

The plate 52 is this able to take with it the support 90 at the time of its movements along sliding surfaces 50.

Still support 90 also comprises, in the vicinity of its upper end 92, a transverse tab 94 that is able to glide into a port 96 arranged on one of the side frames 44.

The port 96 extends essentially in a longitudinal vertical plane and it is not parallel to the sliding surfaces 50.

Thus, when support 90 moves with plate 52, the transverse tab 94 runs through the port, which forms a cam groove followed by tab 94.

Tab 94 thus causes the pivoting of support 90 around the transverse shaft 64 of plate 52 when it moves longitudinally along sliding surfaces 50.

The shape of the port 96, and in particular the variation of its raising with respect to the plane of sliding surfaces 50, determines the ratio between the amplitude of pivoting of support 90 and the amplitude of its movement in the direction of longitudinal sliding surfaces 50.

In the example shown in figure 5, 6 and 7, the accelerator pedal does not act, in a conventional manner, on an accelerator cable. Rather it acts on an electric potentiometer 98 that modulates an electric signal as a function of the angular position of pedal 34 around its pivoting axis A4, this signal being thus transmitted e.g. to an electronic control box of the fuel injector.

Still, so that the driver senses the same feel when touching the accelerator pedal 34, and in order to return the accelerator pedal 34 to its rest position, a return mechanism 100 is provided, which also forms a stop for the accelerator pedal 34 in rest position.

The mechanism 100 is mounted between one end piece of arm 86 of pedal 34 and a stop housing 102.

According to another aspect of the invention, the accelerator potentiometer 98 is also arranged on the stop housing 102 and the stop housing 102 is mounted hinged, at the lower end 88 of support 90, around pivoting axis A4 for the accelerator pedal 34.

According to the same principle as for support 90, the stop housing 102 comprises a transverse operating pin 104 that is received in a groove 106 that is arranged in a fixed manner on a side frame 44 of pedal cluster 32.

When plate 42 moves support 90 in translation parallel to the longitudinal sliding surfaces 50, the lower end 88 or support 90 thus describes a trajectory corresponding to a combination of translation movement and rotation movement around axis A2 of articulation of support 90.

Thus the stop housing 102 is itself moved essentially in the longitudinal direction of the sliding surfaces 50 in such a way that its transverse operating pin 104 runs along groove 106.

Since groove 106 forms a cam groove followed by the transverse operating pin; transverse operating pin 104 controls the stop housing in rotation around its articulation axis A4 on support 90.

Pivoting around axis A4, the stop housing 102 causes the return mechanism 100 to pivot with it, which forms a stop for the accelerator pedal 34 in rest position, while the orientation of pedal 34 varies around axis A4 with respect to the passenger compartment.

It should be noted that it is necessary for the accelerator potentiometer 98 to also be arranged on the stop housing 102, in order that it will always have a fixed position with respect to mechanism 100 forming the stop and, as a result, it will be fixed with respect to the rest position of pedal 34.

In a schematic manner, figures 6 and 7 show the two extreme positions of the accelerator pedal 34 when the plate is in extreme retracted position and extreme advanced position, respectively.

As can be seen, when plate 52 is moved longitudinally from the back to the front, it moves away from the driver and it also moves away from the floor of the vehicle.

Due to the action of the transverse tab 94 sliding into the port 98, support 90 pivots around the transverse axis A2, which moves with plate 52, and in such a way that support 90 causes an additional movement of the transverse axis arranged at its inner end 88, toward the front and upward with respect to the floor, by pivoting in clockwise direction, with reference to figures 6 and 7.

Support 90 thus takes with it the stop housing 102, which due to the action of the transverse operating pin that slides in groove 106, pivots around transverse axis A4 and thus takes with it the accelerator pedal 34 due to the action of the return mechanism 100 forming a stop for pedal 34 in rest position.

By moving pedal 34 away from the driver, it is possible for it to be raised and straightened in such a way that it satisfies the comfort requirements of the driver.

It is obvious that the shape and the position of the port 96 and the groove 106 could be changed; it would be possible to change the law of variation of the pedal position as a function of the position of plate 52.

For example, it could be provided that the port 96 and the groove 106 would be designed such that, in an extreme position of plate 52, pedal 34 would become inaccessible as an anti-theft measure.

Finally, in the example described, only the accelerator pedal 34 is controlled by the support 90 and the stop housing 102 since it involves the pedal that is stressed most by the driver. Still, it is possible to conceive of controlling the brake pedal 36 in the same manner and, possibly a clutch pedal.

CLAIMS

1. Pedal cluster, in particular for an automotive vehicle, of the type comprising at least one pedal (34, 36) for controlling a mechanical element of the vehicle, of the type in which a device (38) is provided for adjusting the longitudinal position of the pedals (34, 36) in the passenger compartment of the vehicle, and of the type in which the pedals (34, 36) are mounted on a plate (52) that is mounted so that it can move on at least one longitudinal sliding surface (50) fastened on a frame (40) that is fixed to the chassis of the vehicle, characterized in that for at least one pedal (34, 36), the adjusting device (38) changes the distance between the pedal (34) and the floor (12) of the vehicle as a function of the adjustment of the longitudinal position of the pedal (34, 36).

2. Pedal cluster according to claim 1, characterized in that the sliding surface (50), on which the plate (52) is mounted, extends along a direction that is oblique with respect to the orientation of the floor (12) of the vehicle in the vicinity of the pedal cluster (32).

3. Pedal cluster according to one of claims 1 or 2, characterized in that the adjusting device (38) modifies the orientation of the pedal (36) in a longitudinal vertical plane of the vehicle as a function of the adjustment of the longitudinal position of the pedal cluster plate.

4. Pedal cluster according to claim 3, characterized in that the pedal (36) is mounted on the plate (52), hinged around a transverse axis (A2), between a rest position and an active position, it controls a mechanical element (68, 70) of the vehicle by means of a link connection rod (82) with fixed length that is hinged, in a vertical longitudinal plane, by its two ends, on one hand on the pedal (36) and, on the other on a control element (66) for the mechanical element (68, 70)

of which a rest position is independent of the longitudinal position of the pedal (36) at rest, and the rest position of the control element (66) for the mechanical element (68, 70) determines the rest position of the pedal (36) around its axis (A2) by means of the link connection rod (82) of fixed length.

5. Pedal cluster according to claim 4, characterized in that a transmission (74), mounted so that it pivots around a fixed axis (A3) that is transverse with respect to the vehicle chassis, is mounted between the link connection rod (82) and the control element (66) for the mechanical element (68, 70).

6. Pedal cluster according to one of claims 1 or 2, characterized in that the pedal (34) is mounted on a support that is mobile with respect to the plate (52), means (94, 96) for controlling the movements of the support (90) are provided, as a function of the movements of the plate (52) with respect to the frame (40).

7. Pedal cluster according to claim 6, characterized in that the support (90) is mounted with rotation around a transverse axis (A2), on the plate (52), and the support (90) is controlled in rotation around its axis (A2) as a function of the longitudinal movement of the plate (52).

8. Pedal cluster according to claim 7, characterized in that the support (90) comprises a transverse tab (94) that is received in a guiding port (96) that is fixed with respect to the frame (40) and which extends in a longitudinal vertical plane, the port (96) and the tab (94) forming, respectively, a cam groove and a cam follower element, and the port (96) is not parallel to the sliding surface (50), such that the transverse tab (94) controls the rotation of the support (90) when it passes into the port (96) during a longitudinal movement of the plate (52).

9. Pedal according to claim 8, characterized in that the orientation of the pedal (36) in rest position is fixed with respect to the support (90).

10. Pedal according to claim 8, characterized in that the orientation of the pedal (34) in rest position with respect to the support (90) is variable.

11. Pedal according to claim 11 (sic), characterized in that the rest position of the pedal (34) with respect to the support (90) is determined by a stop (100) connected to a stop housing (102) that can move with respect to the support (90) and which comprises means (104, 106) of control for its movements with respect to the support (90) as a function of the longitudinal position of the plate (52).

12. Pedal according to claim 11, characterized in that the stop housing (102) is mounted so that it pivots on the support (90) around a transverse axis (A4) and comprises a transverse operating pin (104) that is received in a guiding groove (106) that is connected to the frame (40) and that extends in a longitudinal vertical plane and in that the groove (106) and the operating pin (104) form a cam groove and a cam follower element, respectively, in such a way that the transverse operating pin (104) controls the pivoting of the stop housing (102) when it runs in the groove (106) at the time of a longitudinal movement of the plate (52).

13. Pedal according to any one of claims 3 to 12, characterized in that when the plate (52) is moved longitudinally from the rear to the front, the adjusting device (38) moves the pedal (34, 36) from the floor (12) and orients it in such a way as to arrange it in a more vertical position.

14. Pedal according to any one of the preceding claims, characterized in that a position of the plate (52) is provided in which the pedal (34, 36) is made

FIG.1

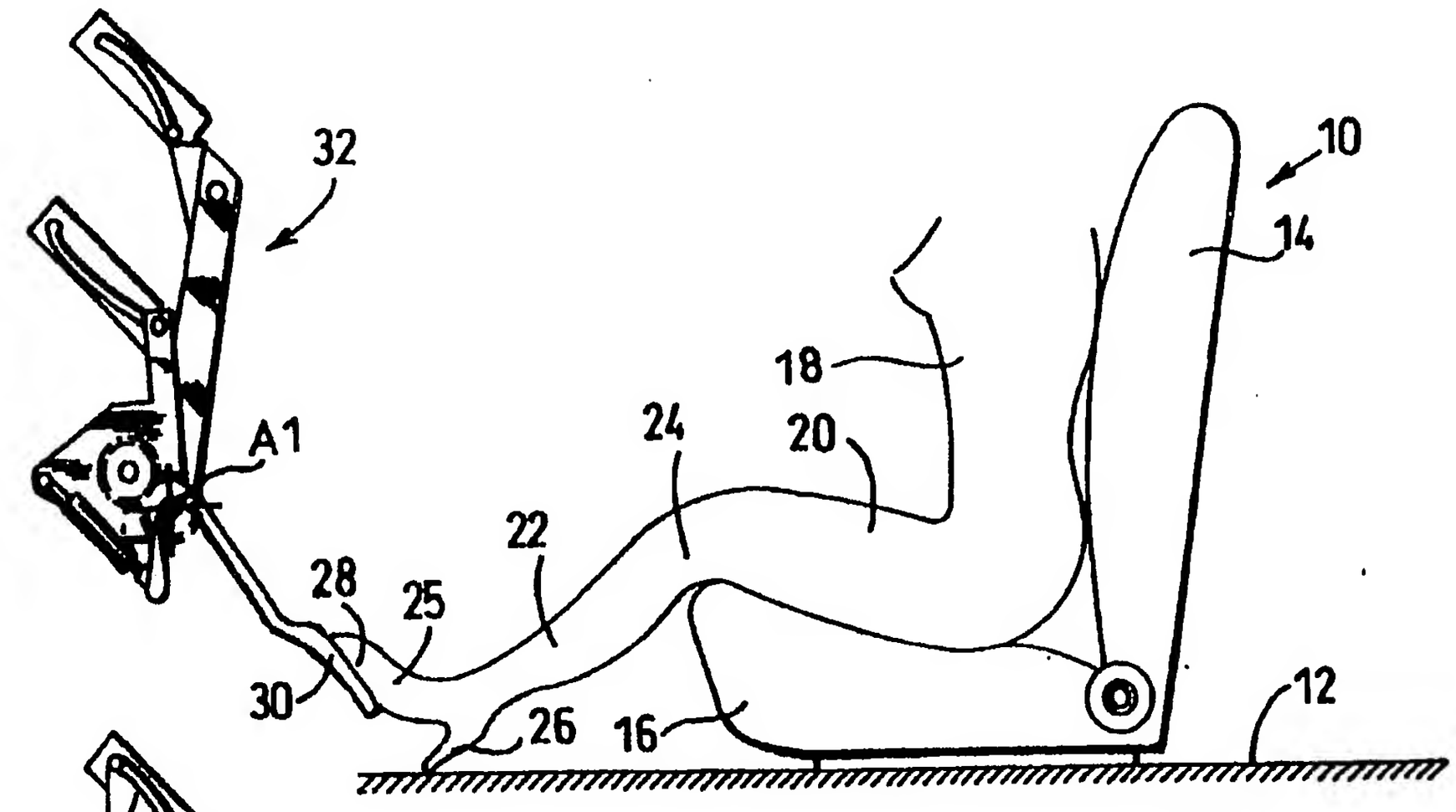
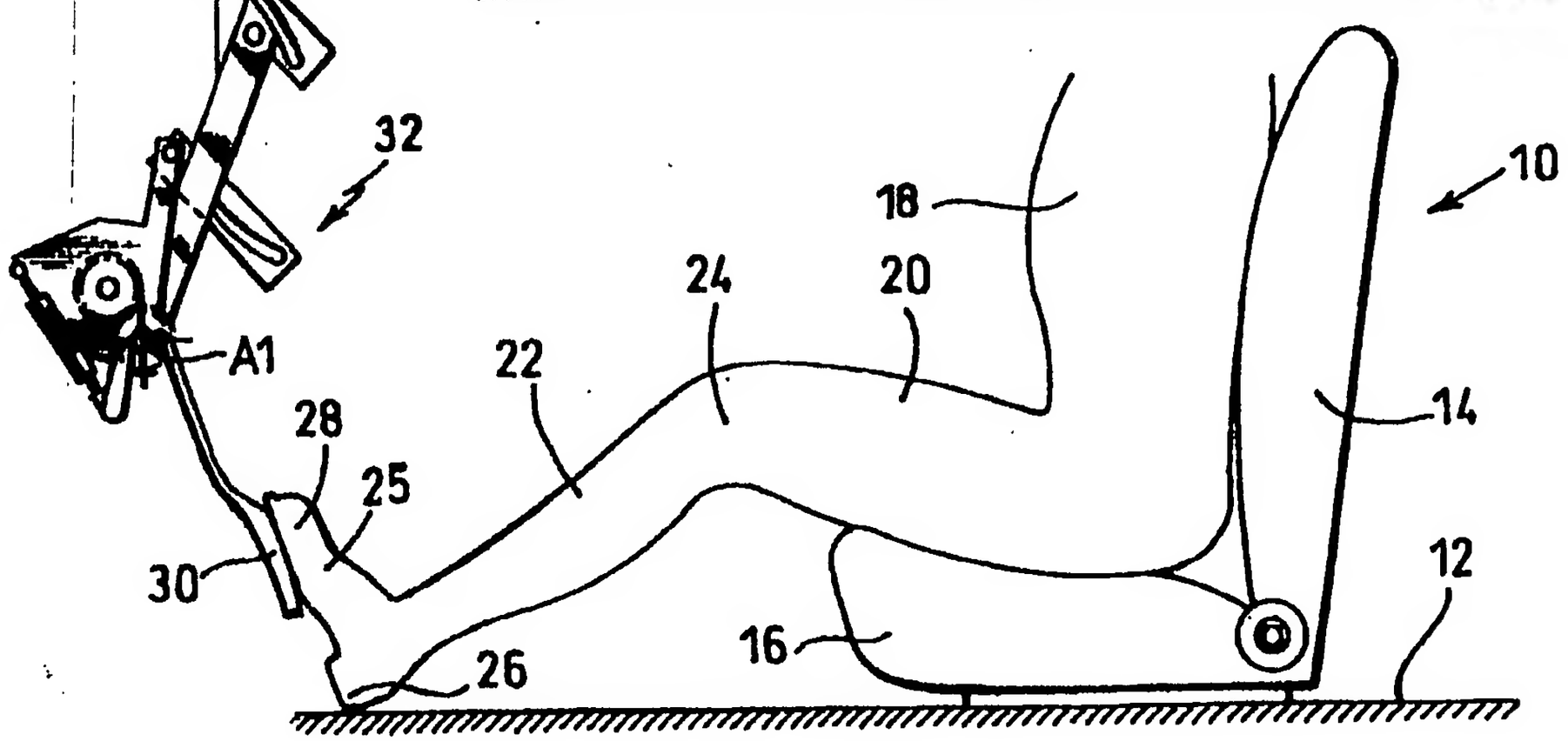


FIG.2



2739847

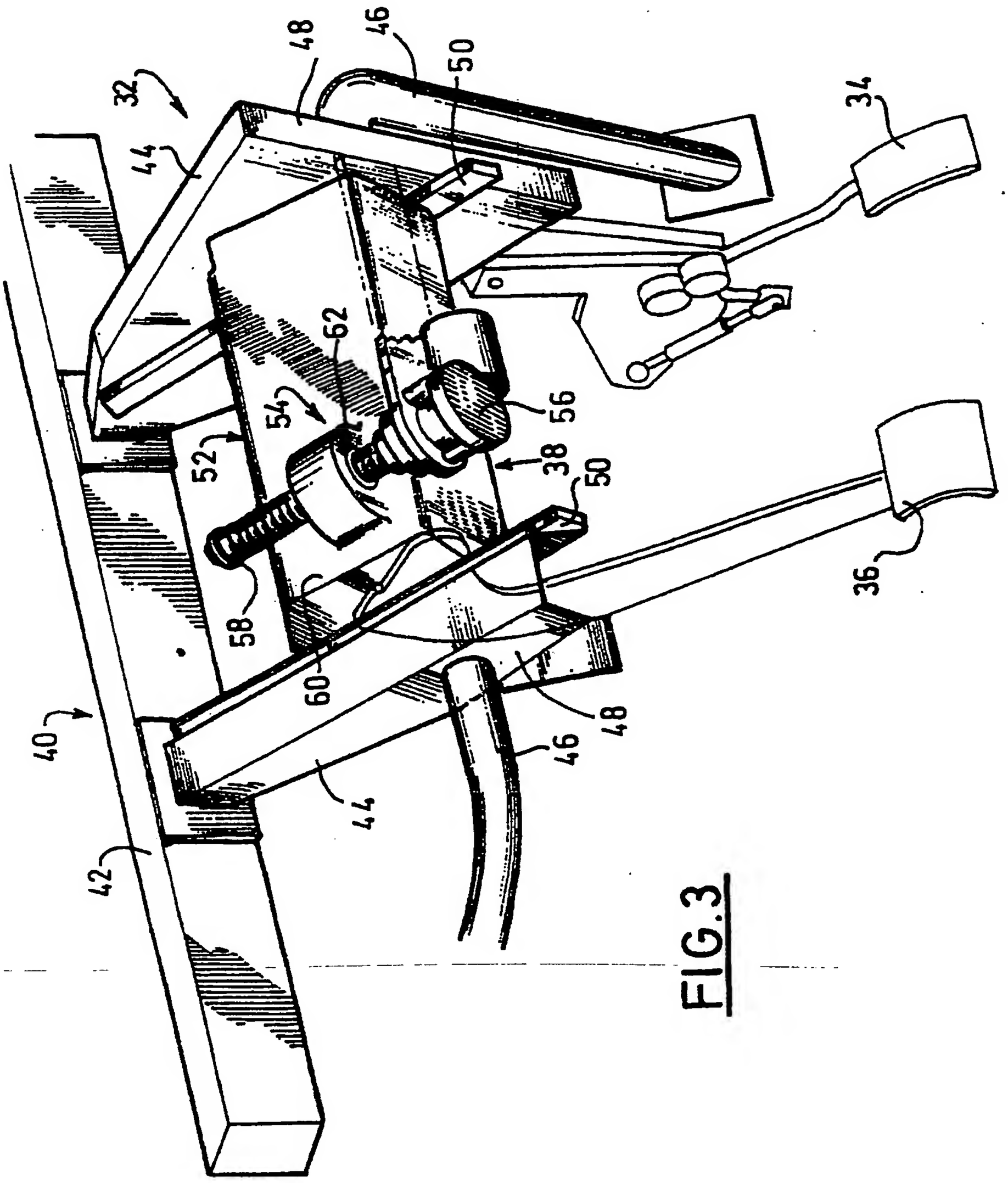


FIG.3

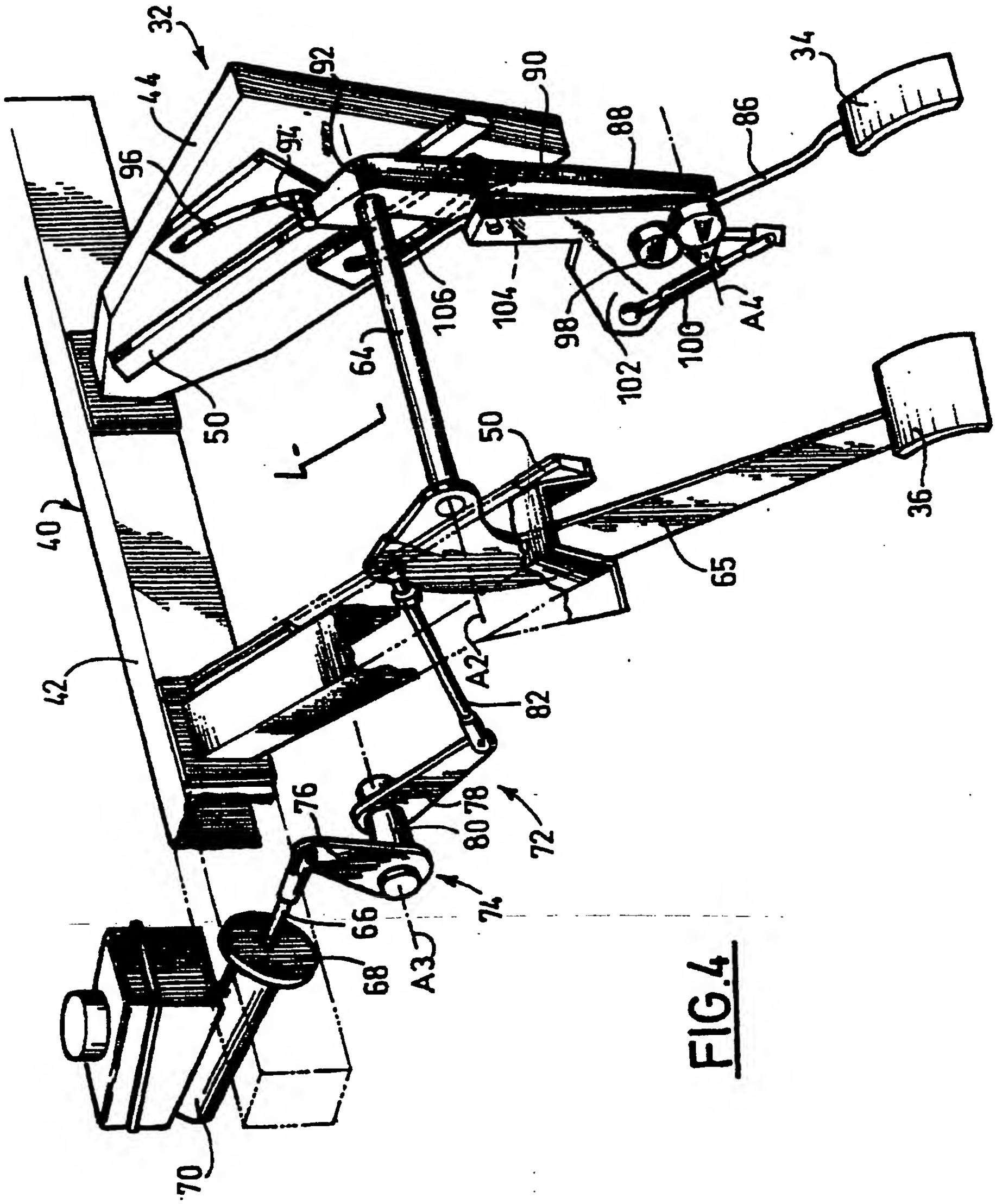
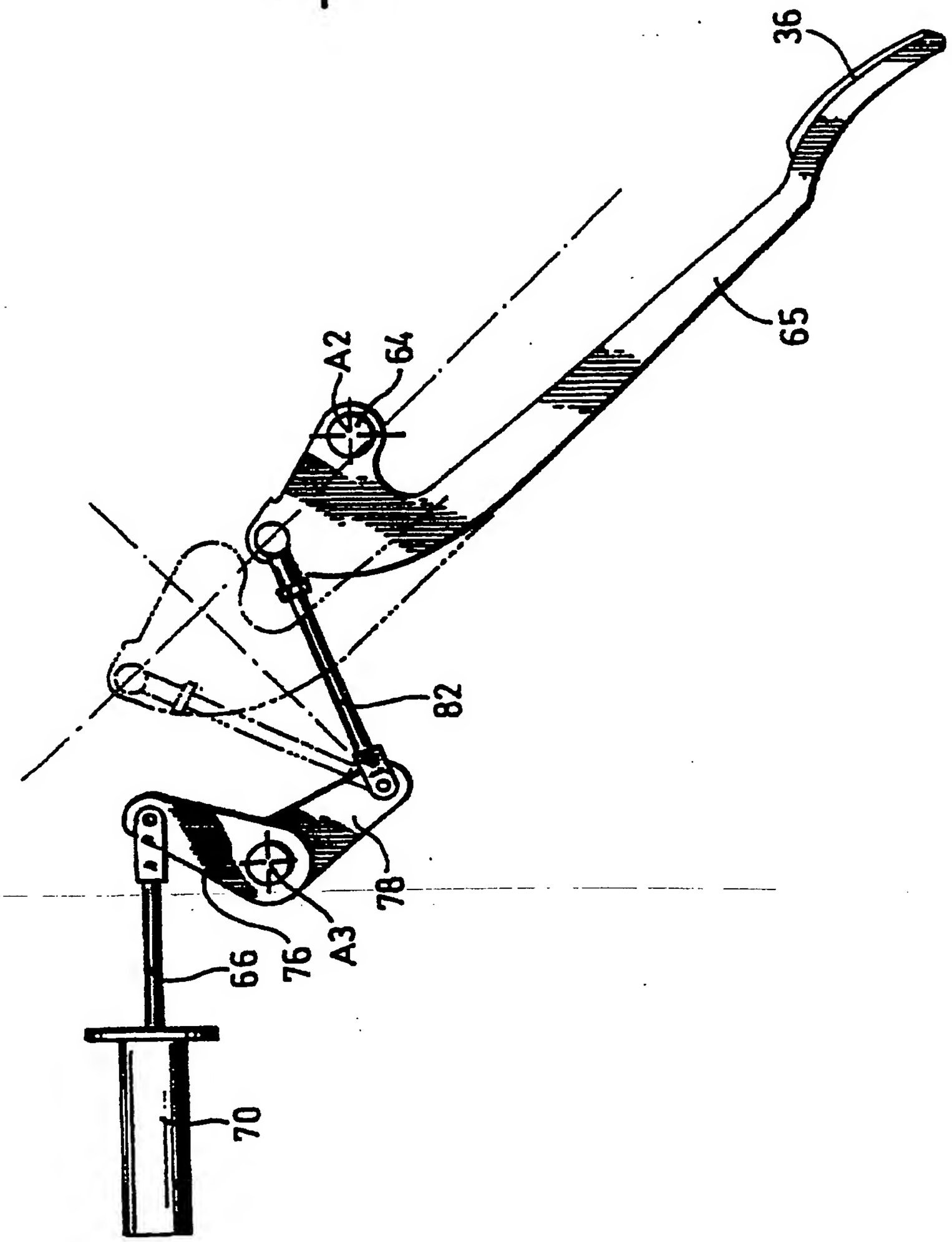

32
44
92
90
34
96
94
88
86
106
104
98
A4
100
102
64
50
36
40
65
42
A2
82
76
78
80
72
74
66
68
A3
70

FIG.4

FIG.5



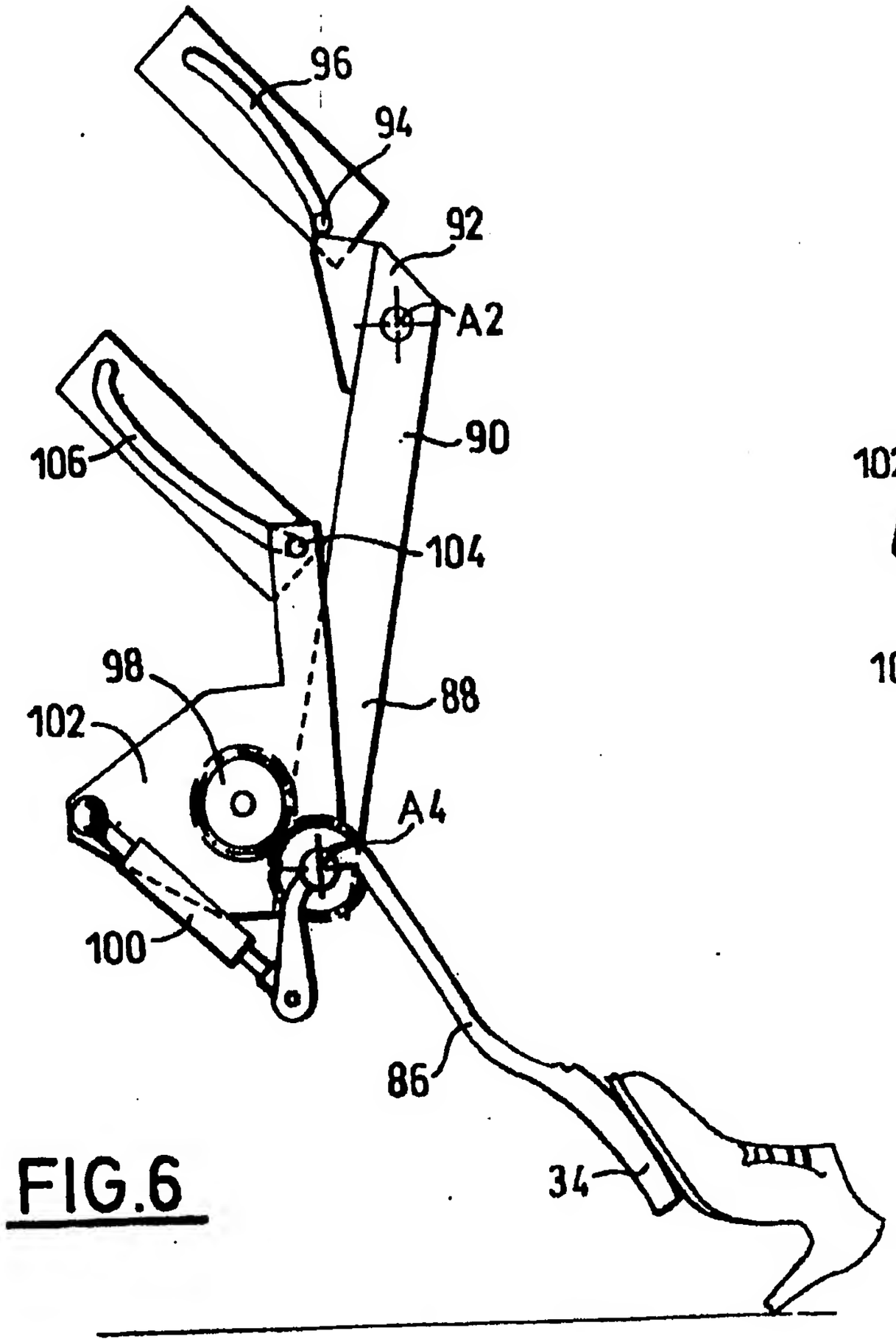


FIG.6

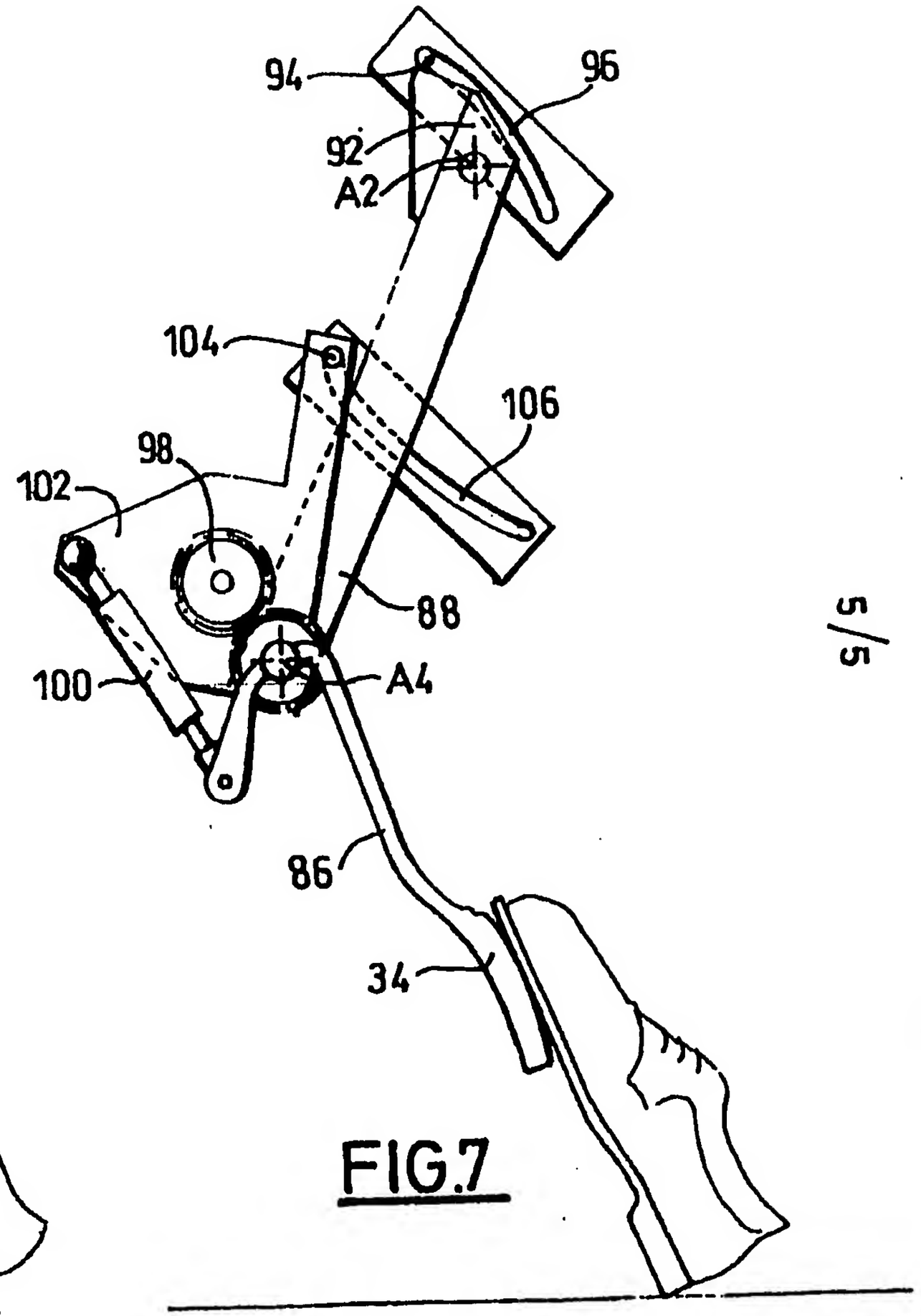


FIG.7

2739847